

Session: CULTURAL RESOURCE II.
SYMPOSIUM ON REMOTE SENSING SURVEYS

Chairmen: Ms. Melanie Stright
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<u>Presentation Title</u>	<u>Author/Affiliation</u>
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Session Summary	Ms. Melanie Stright Minerals Management Service
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Cultural Resources II - Symposium on Remote Sensing Surveys

Ms. Melanie Stright
Minerals Management Service

This session had two primary goals. The first was to discuss recurrent problems in archaeological survey data quality and report adequacy, and the second was to obtain industry comments to planned revisions to Notice to Lessees (NTL) 75-3 (revision No.1).

Three major problems, all involving the magnetometer, were discussed.

The first problem involves the NTL requirement for recording magnetometer sensor tow depths. To meet this requirement, various companies in the marine survey industry have responded either by using depth sensors on the magnetometer sensor or cable, or by calculating tow depth based on vessel speed and the amount of cable out. The latter method results in an approximation of the magnetometer sensor tow depth for the entire survey. Although the sufficiency of this method was defended by one symposium participant, it does not approach the accuracy of continuous tow depth measurements from a depth sensor. Due to the importance of having the sensor as close to the seafloor as possible to detect the relatively small ferrous masses present in an historic shipwreck site, and due to the importance of knowing the position of the sensor in calculating potential ferrous masses from an anomalous signature, the use of mechanical depth sensors will be required by MMS for future surveys.

The second problem discussed was the use of a "zero-mode" (level-mode) setting on the magnetometer for archaeological surveys. It has been stated by the company using this setting that since the primary function of the instrument is to search for anomalies by operating it in zero-mode, the low-frequency variations in the local field are eliminated and the system only responds to rapid anomalous changes from a central print position on the strip chart recorder.

A proton magnetometer records the frequency of the signal generated by precessing protons within a hydrocarbon fluid such as kerosene, alcohol, or water. The frequency of this precession can be directly related to the earth's ambient magnetic field and local magnetic disturbances (anomalies) within that field. When operating in zero-mode, the magnetometer is recording the average amplitude of the precession signal rather than the frequency. This operating mode was developed for use in areas having a steep magnetic gradient, such as exists around oil and gas structures, in order that smaller magnetic sources such as flow lines could be located. When operating in zero-mode, the average amplitude of

the precession signal reaches a minimum value directly over a ferromagnetic object due to the quicker decay of the signal. The effect of averaging the amplitude of the precession signal would be to average background noise levels and low intensity, short duration anomalies out of the data recorded. Since an historic shipwreck often is represented only by a low intensity anomaly (e.g., 5-gammas), zero-mode is not considered an acceptable mode of operation for conducting archaeological surveys.

A third problem discussed is the use of magnetometer strip chart recording scales of greater than 100-gammas, full scale. Recordings at this scale do not permit easy identification of low-intensity anomalies or accurate determination of background noise levels. Therefore, strip charts using a single recording mode of greater than 100 gammas full scale are inadequate to ensure detection of low-intensity anomalies caused by historic shipwrecks. Strip charts using a dual recording mode are acceptable if one of the traces is 100 gammas or less, full scale.

On March 5, 1986, MMS issued a Letter to Lessees to clarify the above three points of the NTL survey requirements.

Another minor issue discussed by the symposium participants was the magnetometer sampling rate. It was agreed that a three-second sampling rate, which is being used by some marine survey companies, is inadequate to ensure detection of short-duration anomalies. A magnetometer sampling rate of one second will be required when MMS produces the second revision of NTL 75-3.

Biography: Please see Session III.F